TURNING POINT

May 1998

Stroh Brewery Improves Cooling System Efficiency and Achieves Savings

PIC TO COME

Optimization of this Pump System Results in Cost Savings

In an effort to improve energy efficiency and the performance of its beer cooling process, the Stroh Brewery Company analyzed the glycol circulation system used for batch cooling beer at one of its facilities. Stroh found that a few minor changes to the system could provide significant savings. By simply reducing the diameter of the pump impeller and fully opening the discharge gate valve, the La Crosse, Wisconsin, brewery reduced the system's energy use by half, resulting in an estimated cost savings of $19,000 the first year. With a project cost of just $1,500, Stroh realized a simple payback of about 1 month.

The fourth-largest brewer in the United States, Stroh purchased G. Heileman Brewing Company in 1996. The company acquired the La Crosse facility (the site of this Showcase Demonstration project), now known as the Heileman Division of Stroh Brewery Company.

Following a screening of the Heileman Division's cooling system by the Energy Center of Wisconsin, Stroh enlisted Michaels Engineering Inc. to perform a feasibility study on the system, recommend energy saving opportunities, and implement cost saving projects. The project team also included Michaels Fluid Balancing Inc. and Northern State Power Company.

After the brewing process, a heat exchanger cools the beer, then it is moved to storage tanks and cooled further by a glycol and water solution. The solution travels through an intricate piping and pumping system to cool the beer storage tanks. This pumping system was the focus of Stroh's feasibility study.

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Motor Challenge Paper on Performance Optimization Wins Award

Motor Challenge team members Julia Oliver, U.S. DOE, and Cynthia Putnam, Macro International, received the 1998 Opflow Publications Award by the American Water Works Association (AWWA) for their paper entitled How to Avoid Taking a Bath on Energy Costs. One paper is selected each year by AWWA for "contributing to operating personnel of water utility systems in the areas of science, technology, and water supply operations." Julia and Cynthia will receive a plaque at the upcoming AWWA Annual Conference in Dallas, Texas. Don Casada of Oak Ridge National Laboratory and Gunnar Hovstadius of ITT Flygt also provided valuable input for the paper.

Excerpts from the Paper (as originally written)

For the full text, please access the Web site at www.motor.doe.gov.

A number of proven strategies exist for optimizing the performance of pumping systems [in the water and wastewater

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A Motor Challenge Publication
www.motor.doe.gov

In This Issue

TURNING POINT

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We're Looking For a Few Good Stories

Motor Challenge staff often speak with folks involved in interesting and successful motor system management projects. We'd like to share some of these stories with other industry professionals. To do so, we need information on projects or management efforts that you or your company has undertaken. We are looking for projects that:

- seek to promote or verify the benefits of increased energy efficiency of purchased equipment;
- involve changes in system operations that had real energy and dollar savings;
- involve retrofit or redesign of blower, fan or pumping systems with big rewards.

Tell us about any motor system project that you undertook that resulted in real actions and savings! We are interested in your motor systems management activities (such as the use of decision making software to help you identify opportunities).

What Do You Get?

We'll select outstanding stories and turn them into Turning Point newsletter articles. Depending on the level of information and documentation available, we might get your story published in the trade press, read by thousands!

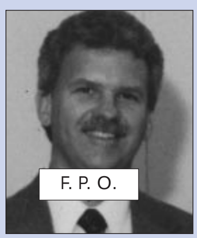
What Do We Need?

To start, please send a short description (no longer than one page total) on the following:

- your company.
- your approach: how you decided on these projects (e.g., using MotorMaster+), what problem(s) you solved, how you got management approval.
- your results: energy and cost savings, return on investment information, and non energy benefits (i.e., productivity gains, improved reliability, reduced maintenance...).
- what you are doing next.

Project descriptions should be sent to: Chuck Procner; 6701 W. 64th St, Ste. 316; Overland Park, KS 66202; phone: (913) 831-2010; fax: (919) 831-6151; e-mail: cprocner@macroint.com. Motor Challenge will review the information and contact you on the next step.

MEET MOTOR CHALLENGE'S PROGRAM MANAGER



Paul Scheihing is the Team Leader of the Office of Industrial Technologies'(OIT) Integrated Plant Improvement team which coordinates the activities of the Motor Challenge, Steam Challenge and Compressed Air Challenge programs. He has been Program Manager of OIT's Motor Challenge Program since the program initiation in 1993. His responsibilities involve working with DOE support offices in the field, national laboratories, and contractors on Motor Challenge projects and activities.

Under his new team leader role, Paul will work with OIT team members to develop a comprehensive product and service portfolio that will focus on near-term plant improvements and efficiency opportunities in motor, steam, and compressed air systems. The Integrated Plant Improvement team's efforts will especially emphasize the development of long-term partnerships with manufacturing plants that are within the Industries of the Future sectors (Forest Products, Steel, Aluminum, Metal Casting, Chemicals, and Glass) that ultimately demonstrate dramatic energy efficiency improvements across the manufacturing plant.

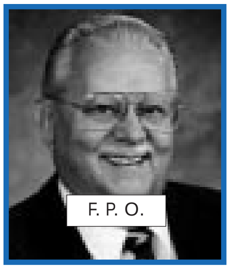
Paul has worked at DOE-OIT since 1988. Prior to managing Motor Challenge, he was a program manager of R&D technology development programs for industrial heat pumps, process heating and cooling systems, and process integration methods and plant demonstrations. Prior to joining DOE, he worked as a Gas Turbine Development Engineer at the Garrett Turbine Engine Company in Phoenix, Arizona, and at Westinghouse Electric Corporation in Concordville, Pennsylvania.

Paul has a B.S. in Mechanical Engineering from the University of Connecticut in Storrs, Connecticut, and a M.S. in Mechanical Engineering from Drexel University in Philadelphia, Pennsylvania. He is a licensed professional mechanical engineer.

Guest Column

Comparing and Applying Motors—a followup article to the March issue Guest Column on Energy-Efficient Motors.

by Kon Lobodovsky



It is essential that a motor comparison is done on the same basis as to type, size, load, cost of energy, operating hours and, most importantly, the efficiency values such as nominal vs. nominal or guaranteed vs. guaranteed. The critical part of the efficiency comparison calculations is that the efficiencies used **must be comparable.**

The equations below will help you determine how to apply and compare motors. Important Note: Replacing a standard motor with an energy-efficient motor in a centrifugal pump or fan application can result in increased energy consumption if the energy-efficient motor operates at a higher RPM. Even a 10 RPM increase in motor operating speed can negate savings from a high efficiency motor retrofit.

For Loads Not Sensitive to Motor Speed

Same horsepower but different efficiency.

$$kW_{saved} = hp \times 0.746 \times \left(\frac{100}{E_{STD}} - \frac{100}{E_{EE}}\right)$$

Same horsepower and % load, but different efficiency.

$$kW_{saved} = hp \times 0.746 \times L \times \left(\frac{100}{E_{STD}} - \frac{100}{E_{EE}}\right)$$

Annual $ savings due to difference in efficiency.

$$S = hp \times 0.746 \times L \times C \times N \times \left(\frac{100}{E_{STD}} - \frac{100}{E_{EE}}\right)$$

Example:

S	= $ Savings (Annual)	
hp	= Horsepower	100
L	= % Load	100
C	= Energy Cost ($/kWH)	0.08
N	= Operating Hours (Annual)	4000
E_{STD}	= % Efficiency of Standard Motor	91.7
E_{EE}	= % Efficiency of Energy-Efficient Motor	95.0
RPM_{STD}	= Speed of Standard Motor	1775
RPM_{EE}	= Speed of Energy-Efficient Motor	1790

For Loads Sensitive to Motor Speed

Above equations should be multiplied by SRCF.

SRCF = Speed Ratio Correction Factor = $(RPM_{EE} \div RPM_{STD})^3$

Example:

S = 100 x 0.746 x 1 x 0.080 x 4000 x (100 / 91.7-100 / 95.0) = $904

S = 100 x 0.746 x 1 x 0.080 x 4000 x (100 / 91.7-100 / 95.0) x $(1790 / 1775)^3$ = $262

$642 reduction in expected savings.

A relatively minor 15 RPM increase in a motor's rotational speed results in a 2.6% increase in the load placed upon the motor by the rotating equipment.

Sensitivity of Load to Motor RPM

When employing electric motors for air moving equipment, it is important to remember that the performance of fans and blowers is governed by certain rules of physics. These rules are known as "The Affinity Law" or "The Fan Law". There are several parts to it, and all are related to each other in a known manner. When one changes, all others change. For centrifugal loads, even a minor change in the motor's speed translates into significant change in energy consumption and is especially troublesome when the additional air flow is not needed or useful. In some cases, the load increase resulting from the use of energy-efficient higher speed motors may be negated or compensated for by resizing of pulleys. Awareness of the sensitivity of load and energy requirements to motor speed can help effectively identify motors with specific performance requirements. In most cases, you can capture the full energy conservation benefits associated with energy-efficient motor retrofits.

Affinity Laws or Fan Laws

Quantity (CFM) varies as fan speed (RPM)

$$\frac{CFM_2}{CFM_1} = \frac{RPM_2}{RPM_1}$$

Pressure (P) varies as the *square* of fan speed (RPM)

$$\frac{P_2}{P_1} = \frac{(RPM_2)^2}{(RPM_1)^2}$$

Horsepower (HP) varies as the *cube* of fan speed (RPM)

$$\frac{HP_2}{HP_1} = \frac{(RPM_2)^3}{(RPM_1)^3}$$

Example:

Fan system **32,000** CFM
Motor **20** hp **1750** RPM (existing)
Motor **20** hp **1790** RPM (new EE)

kW = 20 x 0.746 = 14.92 kW.

New CFM with new motor = 1790/1750 x 32,000 = 32,731 or 2.3% increase.

New HP = $(1790/1750)^3$ x 20 x = 21.4 HP or 7% increase.

New kW = 21.4 x 0.746 = 15.96 kW 7% increase in kW and work performed by motor.

Terminology and Definitions

CFM—*Fan capacity (Cubic Feet per Minute) is the volume of air moved by the fan per unit of time.*

P—*Pressure produced by the fan that can exist whether the air is in motion or confined in a closed duct.*

hp—*Horsepower is the power required to drive an air moving device.*

RPM—*Revolutions Per Minute is the speed at which the shaft of air moving equipment is rotating.*

Improving Compressed Air System Performance: A Sourcebook for Industry

Compressed Air Challenge
Resources for System Optimization

Who wants to learn more about improving the efficiency and reliability of industrial compressed air systems? If you answered YES, then *Improving Compressed Air System Performance: A Sourcebook for Industry* is the awareness-building tool you need. It provides an overview of industrial compressed air systems; a roadmap for identifying system improvement opportunities; fact sheets that describe these opportunities in detail; and a directory of programs, resources, and tools. The sourcebook is one of a series planned for pumping systems, fans and blowers, and motors and drives. It is in a loose-leaf binder to accommodate updates.

This publication, a cooperative effort of Motor Challenge and the Compressed Air Challenge, will cost $19.95 a copy. To order a copy, please call the Motor Challenge Information Clearinghouse at (800) 862-2086.

Protect Your Motors from Overvoltage Stresses in Adjustable Speed Drive Applications

by Annette von Jouanne, Ph.D., P.E. and Haoran Zhang, Ph.D. Candidate Oregon State University

The application of adjustable speed drives (ASDs) for speed control of ac motors has increased due to improved efficiencies, energy savings, and process control. Most ASDs now operate with pulse-width modulation (PWM) voltage source inverters using insulated gate bipolar transistors (IGBTs) in order to reduce switching losses, achieve higher bandwidth, and improve the current waveform quality. Since IGBTs have a short rise time (50ns to 400ns) the motor winding insulation is subjected to higher voltage stresses than ever before, resulting in an increase in motor winding failures from overvoltage surges.

Why increased voltage stress

Fast switching of the IGBTs causes a voltage surge (dv/dt of 6kV/µs) to be developed on both the inverter terminals and the motor terminals. This surge has two major impacts on the motor windings. First, the voltage pulses reflect back and forth between the inverter and motor terminals due to the mismatching of the surge impedances of the motor (high impedance) and cable (low impedance). These reflected voltage pulses add to the transmitted voltage at the motor terminals, resulting in twice the rated voltage. The magnitude of the motor terminal overvoltage corresponds directly with the IGBT rise time (dv/dt) and the length of the cable. IGBT ASDs may create overvoltages on the motor windings that exceed their insulation dielectric capability with cable lengths as low as 20 to 200 ft. (Table 1).

Second, the high switching frequency (2kHz to 20kHz) prevents the voltage from distributing evenly within the motor winding. At times the voltage on the first coil can reach over 75% of the total voltage of the winding. The combination of the above scenarios greatly increases the electric stress on the motor winding insulation in PWM ASD applications. Low voltage motors (600 volts and below) are also more vulnerable since these motors are usually random wound where the first turn and last turn may be in contact, resulting in full coil voltage being applied to the adjacent turns.

Effect of motor terminal overvoltage on the integrity of the motor magnet wire

Factors such as thermal, electrical, and mechanical stresses and a harsh environment can severely harm the integrity of the magnet wire insulation and sharply reduce its life expectancy. In switch-mode IGBT ASD applications, voltages between adjacent wires in a random-wound motor can reach magnitudes high enough to cause partial discharge (corona). Partial discharge is the breakdown of the air in the vicinity of an electrode under the stress of an electric field. The discharge on each pulse cycle gradually erodes the insulation surface and causes pits and cavities. It also produces ozone and nitrogen oxides, which deteriorate the insulation strength. Partial discharge can lead to premature motor failures, in some cases within months of the ASD installation.

How to protect your motors from overvoltages

Several methods can protect motors from overvoltages caused by ASDs. NEMA standard MG1-31 specifies low voltage-rating motors designed for ASD applications. This suggests customers should choose specially designed and manufactured motors for their ASD applications. These special motors use improved technology and materials including form coil windings, which limit the voltage between adjacent wires, or new magnet wire insulation that provides a higher pulse endurance index (PEI). When special motors are not appropriate or available, or when longer leads are necessary, i.e. > 20ft, other mitigation techniques should be considered.

Keeping cable length short

Today, IGBT ASDs have voltage rise times of tenths of microseconds. Therefore the critical cable length at which voltage doubling occurs is much shorter than suitable for most industrial applications (20ft for standard IGBTs with 0.1 µs rise times). But whenever possible, reducing the cable length well below the critical length provides protection against overvoltages (Table 1).

Reliance Electric Embarks on Exciting Initiative

As a result of a new initiative by Rockwell Automation/ Reliance Electric, the number of Motor Challenge Allied Partners just increased by 35%! Under the initiative, 50 Reliance Electric Five-Star distributors will join the Allied Partnership, increasing the number of Allied Partners to more than 220.

Reliance refers to these Five-Star distributors as "Market Makers" for their consistently high sales and "Solution Providers" for their customer focused technical support. "By becoming Allied Partners, our Five Star distributors will take a more active role in applying, integrating, and promoting energy-efficient products and processes. This will ultimately help our customers optimize energy use and succeed in the global manufacturing marketplace," explains Rick Payton, Reliance's Director of Distributor Sales.

The Five-Star distributors will join other Allied Partners as the leading companies in automation, electric power, and scientific research that are helping DOE promote energy-efficient manufacturing strategies. Reliance Electric Five-Star distributors will host training seminars on efficient motor systems, sponsor promotional events, and distribute brochures and energy management software developed by Motor Challenge and its Allied Partners. Reliance staff will be trained on the use of Motor Challenge software tools, such as MotorMaster+.

Finally, Reliance and their Five-Star distributors will share information about their motor system efforts and successes with Motor Challenge. Some of these efforts will be developed into case studies available through Motor Challenge.

Other Reliance Efforts:

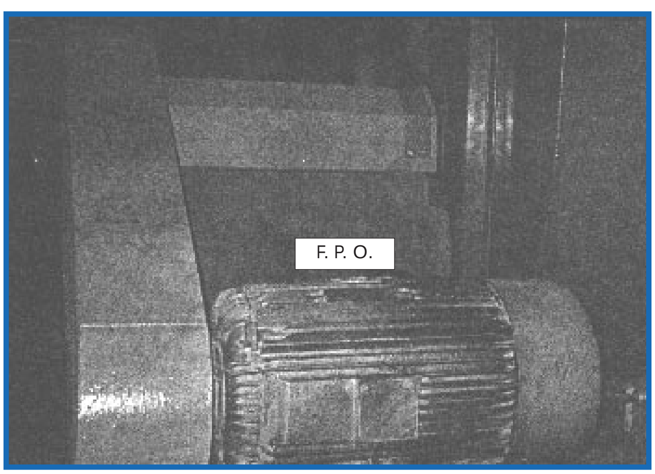
More than 100 Reliance Electric field offices will broadcast the Motor Challenge International Teleconference, Efficient Motor Systems II: Your Path to Profits, *on May 19. These offices will each host events for between 30 to 50 customers that will include wrap-around training and information sessions to augment the teleconference broadcast.*

In addition, Reliance has made the Motor Challenge MotorMaster+ software available on the Reliance Web site and on its Reliance Electric Web CD!

Allied Partner Energy Center of Wisconsin and Motor Challenge Join Forces on Performance Optimization for Fan, Pump, and Blower Systems

The Energy Center of Wisconsin (ECW) and Motor Challenge have teamed up to deliver the benefits of performance optimization since 1994 when they held their first training on the issue. Now they are at it again. ECW, the University of Wisconsin at Madison, and Motor Challenge are cosponsoring a two-day interactive workshop focusing on performance optimization in Green Bay, Wisconsin, on June 1 and 2. The primary goal of the workshop, geared toward the end user, is to provide attendees with the motivation and ability to implement optimization projects at their facilities. The workshop will teach attendees how to:

- identify performance optimization opportunities, such as impeller trimming, speed changes, and new equipment;
- quantify these opportunities so they may undertake the optimization analysis themselves for low- risk projects; and
- recognize high-risk situations where an expert is needed to conduct a rigorous performance test and feasibility study.



This 125-hp blower at Louisiana Pacific now uses less than half as much energy thanks to a fan and blower optimization project.

In addition, this workshop will provide the tools to show senior management why implementing their performance optimization project is smart business. The workshop will include interactive exercises, demonstration models, and other hands-on activities. Case studies will show attendees how plants like foundries, paper mills, food processors, and water treatment facilities have saved money and increased productivity.

The workshop promotes concepts demonstrated at the Motor Challenge Showcase Demonstration sites including the Town of Trumbull, CT; City of Milford, CT; Louisiana Pacific; and the Heileman Division of Stroh Brewery. The Heileman Division and Louisiana Pacific have also participated in ECW performance optimization projects.

Motor Challenge and ECW are united in their commitment to work together to help industry get the most out of their motor-driven systems. Together, Motor Challenge and ECW have developed materials such as videos on performance optimization strategies and the curriculum for the training workshops.

For more information on the Wisconsin workshop, contact Ron Wroblewski at 608-238-8276, ext. 25, or e-mail industrial@ecw.org.

Motor Challenge Paper Wins Award

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industry]. Potential energy savings are large, ranging from 20 to 50 percent. These strategies were presented to more than 600 facility operators throughout the nation in a recent workshop series sponsored by the U.S. Department of Energy's Motor Challenge Program with support from the American Water Works Association, Electrical Apparatus Service Association, and the Hydraulic Institute.

Pumping Improvements Impact Entire Systems

"We want to keep in mind a picture of the whole system and what it's trying to accomplish," emphasized workshop instructor Don Casada of Oak Ridge National Laboratory. The reason is that a favorable adjustment to one individual component within a pump system may cause another component to operate less efficiently.

While whole pumping systems consist of many components—from the electric utility feeder, transformer, and motor system to the pump and fluid system—a major source of inefficiency can be in the fluid system. This is a system over which operators have some control. It starts with understanding how the system is performing and where operators can have influence. For example, unnecessary sources of friction loss in the fluid system can increase energy use. However, not all friction losses can be influenced by operators. "Once the system is designed and built, the ability to influence frictional losses caused by pipe length, diameter, and roughness is very limited," notes Casada.

By contrast, friction losses caused by piping components (particularly valves), unnecessary flow paths, and higher than necessary flow rates can be influenced by operators and can have a significant impact on energy costs. Nowhere is this more true than in the case of throttled valves. "Associated with every valve are dollar costs," emphasized Casada. He suggests operators take their own measurements to determine overall frictional losses in their systems. Loss coefficients, published by the Hydraulic Institute and valve manufacturers, can be used to estimate losses where measurements are impractical. Excessive noise at pipe components is often a tell-tale indicator of unnecessary friction losses. So, if your system is large, targeting the noise points is a good way to get started.

Plot System Performance to Help Plan Improvements and Measure Results

Knowing more about frictional losses also allows operators to create a *system head curve* which provides a picture of fluid system performance (total system head as a function of flow rate). The system curve, plotted on a graph with the *pump head curve,* allows operators to calculate the "operating point" of the system. "Understanding where you are on the pump curve relative to the normal operating conditions," notes Casada, "is an important first step in the process of optimizing performance." This allows operators to evaluate the impact particular changes in conditions (such as adjustments to bypass valves, trimming impellers, or adding a variable speed drive) have on overall system performance.

Motor System Improvements Also Reduce Costs

Looking beyond the fluid and pump systems, Casada considered the energy savings impact of improving motor efficiency. He found that motor efficiency typically varies little throughout a motor's normal operating range. "While replacing an older, standard efficiency motor with a premium efficiency motor clearly has energy and operational cost saving benefits," states Casada, "system-related issues may be significantly greater." He concluded that making efficiency improvements without addressing fluid system issues have minimal effect.

Case Studies Show How Greater Efficiency Can Reduce Costs

Milford, CT. In Milford, Connecticut, the Welches Point Pump Station reduced its energy use by 21 percent through the addition of a smaller pump to an existing waste water pump system. Gunnar Hovstadius, Director of Engineering at ITT Flygt Corporation, performed the engineering work on the project and presented the findings. "Good data collection was an essential first step in the process," Hovstadius emphasized. "This enabled us to establish a baseline of flow rate over time and pinpoint pump system energy consumption." Hovstadius found that while the Welches Point pump system had been designed for a peak capacity of 3,000 gpm (using two 3,000 gpm pumps), the actual system flow rate most of the time was under 1,000 gpm. The solution was to install a third pump sized at a lower flow rate to handle the station's needs most of the year. A smaller 1,400 gpm pump was installed.

Denver, CO. In Colorado, a number of performance optimization strategies were undertaken at the Highlands Pump Station located in the Denver metro region. Greg Hempelman, Engineering Manager, and Mark Keilwitz, Electrical Engineer, for Denver Water, oversaw the performance improvements. "We found annual electrical energy savings of $43,000 from installation of high efficiency motors, pump impeller

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Stroh Brewery Improves Cooling System

continued from page 1

Originally, the pumping system consisted of three parallel pumps, directly coupled to three 150-hp electric motors. The project team analyzed the system and decided trimming one pump's impeller was the best option. The team discovered that 70% of the head produced by the pump was consumed by a closed gate valve on the pump discharge.

Adjusting the impeller's diameter from 14.75 to 11.75 inches significantly improved performance by matching the pump's output with the system's head and flow rates. This meant the discharge valve could be fully opened to maintain a normal flow rate and allowed use of a smaller, 75-hp motor.

The Heileman Division's optimized system increased flow rate 15 percent, and the 75-hp motor cut electricity from 112 kW to 54 kW. As a result, annual energy costs fell from $36,700 to $18,300. Other benefits include greater cooling availability for peak load periods, extended equipment life and decreased maintenance, and updated information about the system.

This project proves companies can achieve substantial cost and energy savings from relatively small investments. For copies of Showcase Demonstration case studies, please call the Motor Challenge Information Clearinghouse at (800) 862-2086.

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replacements, variable speed pumping, and pump suction improvements at the facility," he said.

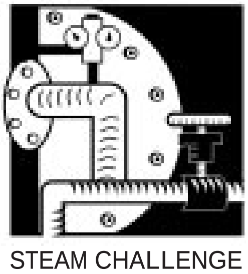
Lowell, MA. Lowell WaterWorks in Lowell, Massachusetts is a raw water pumping facility with a capacity of 18 million gallons per day operating four vertical turbine pumps in parallel. As part of several evaluations, HEC Energy Services focused on the system and recommended several cost saving opportunities. The first involved monitoring variable speed drive operation on three of the four pumps that controlled water flow. This analysis revealed that the facility had still been throttling pump discharge valves to achieve flow control (a common practice at the plant prior to installing the variable speed drives). It provided an opportunity to demonstrate to facility staff the potential savings if the new drives were fully utilized.

The second strategy involved a followup operational adjustment to the system which involved operating two pumps at higher speeds, instead of three, to achieve desired flow. At higher speeds, the two pumps performed more efficiently, thereby reducing power requirements.

Gainesville, FL. The Kanapaha Water Reclamation Facility is a wastewater treatment plant operated by Gainesville Regional Utilities (GRU), a mid-size integrated Florida Utility company which is owned by the City of Gainesville. "We identified 13 strategies which could be cost-effectively implemented," said Bob McVay, Assistant General Manager for Water Wastewater Systems at GRU. Several were O&M measures—turning off chlorine mixers, cycling digester aerators, increasing aerator efficiency, night setback, and HVAC overhaul—involving little or no capital investment, yet offering estimated annual savings of $39,000. Other changes included energy conservation measures such as automating digester operations and RAS pumping, high efficiency motors, and motion sensors.

[They implemented] all but two of the thirteen recommended strategies. Since 1990, Kanapaha's anticipated energy costs have fallen 12 percent, despite increases in plant flow of 9.5 percent. Current energy costs are $4,000 below 1990 levels.

The Steam Challenge—From Awareness to Efficiency



Did you know that neglecting your steam systems costs your company! Achieving a more efficient steam system can result in significant energy, cost, and air emissions savings. These realizations and more are what prompted the U.S. Department of Energy in partnership with the national, non-profit Alliance to Save Energy and several private companies and associations to launch an initiative called the Steam Challenge. The Steam Challenge highlights the importance of steam system efficiency and provides information and technical assistance on technologies for today's industrial steam systems.

The Steam Challenge sets out to accomplish with steam systems what Motor Challenge does with motor systems—to help U.S. manufacturers increase productivity and lower production costs by improving the energy efficiency of their systems. It will accomplish this using basic strategies, such as communicating with industry to identify useful tools and information products, organizing workshops, centralizing existing information by establishing a steam efficiency Web site, and developing steam efficiency diagnostic tools to estimate energy savings.

It is projected that efficiency gains of 30%–40% could be met by improving boiler performance, insulating and upgrading steam delivery systems (i.e., steam traps), and recovering waste heat to preheat boiler feedwater, among other actions. Such efficiency gains would include decreasing industrial energy consumption, reducing energy costs, preventing emissions, and reducing capital outlays for new steam generation capacity. An increased focus on steam efficiency results in productivity and safety benefits that are likely to be far greater in value than those related to fuel savings.

The Steam Challenge presents a unique opportunity to increase awareness of steam energy efficiency among plant operators, engineers, and managers. One way the Steam Challenge will accomplish this is through showcase demonstrations and case studies of companies implementing successful steam system efficiency projects. Eventually, the Steam Challenge can be applied more broadly to steam systems located in schools, hospitals, large commercial buildings, and municipal district heating systems.

Improving the performance of your steam systems can save your company money.

For more information on the Steam Challenge, check out the NEW Web site at: www.oit.doe.gov/Access/steam. Or call Fred Hart, Steam Challenge, U.S. DOE, at (202) 586-1496 or Ted Jones, Steam Challenge, Alliance to Save Energy, at (202) 530-2225.

Coming Events

May 19	Motor Challenge Teleconference, Broadcast Live 9am to 11am Pacific; call (800) 862- 2086 or access the Web site at www.motor.doe.gov
May 20	ASDMaster Training Workshop, cosponsored by Motor Challenge Allied Partners, Irwindale, CA; call Anna Maksimova at (360) 754-1934
June 1-2	Optimizing Performance of Industrial Systems: Fan, Pump, and Blower Systems Training, Green Bay, Wisconsin; call Becky Punzel at (608) 238-8276, ext. 20 to register
June 10	ASDMaster Training Workshop, cosponsored by Motor Challenge Allied Partners, Reading, PA; call Anna Maksimova at (360) 754-1934
June 16-18	Air & Waste Management, San Diego, CA; call (412) 232-3444
June 19	ASDMaster Training Workshop, cosponsored by Motor Challenge Allied Partners, Honolulu, HI; call Anna Maksimova at (360) 754-1934
August 23-28	ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA; call Rebecca Lunetta at (202) 429- 8873 or access the Web at http://aceee.org
August 31-Sept. 1	Energy Efficiency Forum for managers and op. personnel of municipal and industrial water and wastewater systems, sponsored by EPRI and Water-World Magazine, Denver, CO; call James Laughlin at (918) 832-9320
September 13-17	World Energy Congress, Houston, TX; call Barry Haest at (713) 963-6238

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INFORMATION CLEARINGHOUSE

Do you have questions about using energy-efficient electric motor systems? Call the Motor Challenge Information Clearinghouse for answers, Monday through Friday 9:00 a.m. to 8:00 p.m. (EST).

HOTLINE: (800) 862-2086

Fax: (360) 586-8303, or access our homepage at www.motor.doe. gov

Motor Workshops

The New York chapter of the American Water Works Association (AWWA) is putting on the following motor workshops to help participants improve the efficiency of motors, drives, and pumping applications in the municipal water industry:

- June 11, 1998, Buffalo, NY
- June 12, 1998, Syracuse, NY
- September 10, 1998, Long Island, NY
- September 11, 1998, New York City, NY

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